

Test Outcome:

Performance Test Cycle 4 – Institution Login, Annual Submission, Case Management Login, Query (search), Create Users and Complete ACD scripts were tested in a 2 web and 2 app servers configuration. The test was stopped for trouble shooting issues encountered during the test cycle. The two issues were resolved in the same day.

Application Background:

This eZ-Audit initiative is designed to provide a paperless, single-point of receipt and access for financial statements and compliance audits for institutions participating in Student Financial Aid Title IV programs. The Electronic Audited Financial Statements (EAFS) & Compliance Reports application will reduce the cycle-time required to collect and process financial statements and compliance audits from more than 8,500 proprietary, non-profit, and public institutions. The application will enhance the ability of Case Teams and the Document Receipt and Control Center (DRCC) to accurately record and report status of school reporting; therefore, addressing concerns listed in a recent GAO audit. The quality of FSA service to institutions will also be improved by this application via the timely acceptance and processing of the audited financial statements and compliance reports. This initiative will focus on both FSA audits and Office of Management and Budget (OMB) Circular A-133 audits (both compliance and financial).

Cycle Background:

eZ-Audit Performance Test Cycle 4 was executed on March 13, 2003. The goal for this test cycle was to test the scalability of the application in a 2 web and 2 app servers environment.

Hardware and Configuration:

The configuration for the test was two web servers and two application servers architecture. The web servers are SU35E4 and SU35E6 with 4 CPUs and 2GB Memory each. The application servers are SU35E11 and SU35E4 with 4 CPUs and 2 GB Memory and one clone each. 512 max clients set on the web server. Servlet threads were set to 200. The number of JDBC connections to the application database was set to 20. Application JVM was to 128 MB. The configuration featured two Oracle databases, a default WAS session database and EZPRF database.

Detailed Description:

Performance Test Cycle IV was executed on Thursday, March 13th, 2003. 2 application clones were brought up for the scalability test. Numerous failures were taken on all scripts after the starting of the test. Majority of the failures were on the logging-in transaction. Instead of logging the users in to the application, the users were getting "session expired" message and failing. The test was stopped for troubleshooting.

After verifying the validity of the configuration, several trails were conducted to narrow down the problem. It was found that under a single clone configuration, the session time out issue did not occur. However, with two clones the issue resurfaced. It led the ITA and the application team to believe that there was a problem with session management either within the application code or the application server.

250 users were loaded on to the application on a single clone environment to troubleshoot the session management issue. All business processes were part of the test scenario. High response time was observed at the beginning of the test. Transactions that were database related exhibited high response time. JDBC connection time increased steadily to the 600 milliseconds range. Trouble shooting on this performance issue started during the test and continued into the afternoon.

It was observed that the JDBC connections were not being dropped. Thus, two paths were taken on resolving it. First, it was discovered that the connection closure commend was placed in the try and catch block. This setup could lead to connections not being closed properly and create hung connections. ITA best practices suggest that a JDBC connection should be closed in the finally block. This way, connection closure can be made certain. The application team took the suggestion and made modification to its code. Second, the ITA team applied a JDBC driver patch that included recent fixes on the driver. After these steps were taken, improvements were seen in terms of JDBC pool management, however, long response time still existed.

It was later discovered that there was a large number of users in the user list. The user list was pulled from the database when a Co-Team lead tried to add and delete user or update user information. Under normal condition, the list should have been between 20 to 30 people. It was found that there were 1,700 users in the system. Thus, the pulling of this list held the JDBC connection and caused application wide performance issue. The large size of the user list was caused by several co-team leads deleting the same user in the script. The script was fixed and tested.

After fixing the script and removing the extra users off the list, a test with 250 users and all 6 scripts were run. At 250 users load, response times on each transaction was below 5 seconds except for uploading the 3 MB sized pdf file transaction. JDBC connection times were at 85 milliseconds and never maxed out on the pool size. The test run for an hour and no performance issue observed.






Trouble shooting the session management issue took place late evening on the same day. The ITA team verified and was certain about the application configuration thus the focus of the troubleshooting was on application code. It turned out that the application was using a HTTP Request API that did not force a session database access that caused the session issue. The API, Request.isRequestedSessionIdValid() that the application used only checked to see if there was an existing session

for a particular user on one clone. It did not check to see if this session information was persisted in the session database. Thus, when switching over to the other clone, existing session information was lost and caused application to fail. A different API, `Request.getSession(false)`, was suggested by the ITA team. The new API forced session database access and check to see if there was an existing session. The new API was put in code with proper code modification. A test was run after the code fix and it showed sessions were properly managed.


The test execution and trouble shooting process took proximally 36 resource-hours.

Institution Login, Annual Submission, Case Management Login, Search, Create Users and Complete ACD

Statistics Summary

	Maximum Running Vusers:	250	
	Total Throughput (bytes):	2,394,538,695	
	Throughput (bytes/second):	Average: 503,054	
	Total Hits:	566,231	
	Hits per Second:	Average: 118.956	View HTTP Responses Summary

Transaction Summary

	Transactions:	Total passed: 35,158	Total failed: 40	Total Stopped: 11
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Transaction Name	Minimum	Average	Maximum	90 Percent	Pass	Fail	S
S01_1_EnterHomePage	0.344	0.407	2.125	0.451	3,500	0	0
S01_2_Login	0.719	0.923	4.188	1.076	3,500	0	0
S01_3_Logout	0.031	0.058	1.094	0.07	3,500	0	0
S01_InstitutionLogin	6.996	7.393	10.641	7.573	3,500	0	0
S03_01_EnterHomePage	0.344	0.402	0.516	0.431	80	0	0
S03_02_Login	0.906	1.104	1.953	1.227	80	0	0
S03_03_EnterAnnualSubPage	0.625	0.929	9.734	0.884	80	0	0
S03_04_EnterBalanceSheet	0.234	0.453	4.297	0.451	80	0	0
S03_05_CalculateBalanceSheet	0.313	0.406	1.656	0.451	80	0	0
S03_06_EnterStatementOfActivites	0.313	0.462	2.984	0.541	80	0	0
S03_07_CalculateStatementOfActivities	0.219	0.275	0.469	0.341	80	0	0
S03_08_EnterCashFlowStatement	0.219	0.343	0.875	0.431	80	0	0
S03_09_CalculateCashFlowStatement	0.219	0.242	0.563	0.23	80	0	0
S03_10_EnterAnnualSubPage	0.281	0.414	1.547	0.461	80	0	0

S03_11_EnterCheckListPage	0.328	0.969	7.922	1.258	80	0	0
S03_12_EnterFileUploadPage	0.313	0.693	4.406	0.561	80	0	0
S03_13_ViewHelpPage	0.391	0.549	1.203	0.662	80	0	0
S03_14_UploadFile	30	35.483	43.328	38.83	80	0	0
S03_15_ViewSubmitMessage	0.109	0.368	3.813	0.622	80	0	0
S03_16_Submit	1.25	1.648	2.656	1.918	80	0	0
S03_17_Logout	0.188	0.218	0.422	0.23	80	0	0
S03_AnnualSubmission	3,398.339	3,405.906	3,441.246	3,409.019	80	0	0
S08_01_EnterHomePage	0.344	0.409	2.063	0.451	1,400	0	0
S08_02_Login	0.453	1.558	10.578	3.025	1,400	0	0
S08_03_Logout	0.031	0.065	1.109	0.09	1,400	0	0
S08_CaseTeamLogin	6.875	8.039	17.125	9.483	1,400	0	0
S10_01_EnterHomePage	0.141	0.202	0.328	0.24	265	0	0
S10_02_Login	0.453	1.692	10.609	3.179	264	0	1
S10_03_EnterSearchPage	0.094	0.249	2.531	0.351	264	0	0
S10_04_Search	0.313	0.498	2.078	0.632	264	0	0
S10_05_Logout	0.031	0.06	0.609	0.09	264	0	0
S10_Query	13.25	14.723	25.047	16.462	264	0	1
S11_01_EnterHomePage	0.344	0.402	1	0.431	591	0	0
S11_02_Login	0.406	0.611	2.219	0.763	590	0	0
S11_03_EnterManageUserPage	0.422	1.203	7.375	1.918	590	0	0
S11_04_EnterAddUserPage	0.109	0.259	1.078	0.371	590	0	0
S11_05_AddUser	1.203	2.404	8.672	4.279	590	0	0
S11_06_EnterDeletionPage	0.078	0.356	3.266	0.592	590	0	0
S11_07_CancelDeletion	0.281	0.975	5.875	1.867	590	0	0
S11_08_GoToNextPage1	0.172	1.017	7.734	1.725	589	0	1
S11_13_SelectUserToDelete	0.078	0.364	2.406	0.632	589	0	0
S11_14_DeleteUser	0.188	1.073	20.266	1.918	588	0	0

S11_15_SelectByName	0.141	0.306	1.375	0.451	587	0	0
S11_16_ReturnToFirstPage	0.453	1.246	7.422	2.183	584	0	1
S11_17_SelectByUserName	0.141	0.319	1.938	0.461	584	0	0
S11_18_UpdateEmail	0.484	1.339	7.609	2.388	584	0	0
S11_19_Logout	0.031	0.061	1.203	0.09	584	0	0
S11_CreateUser	50.313	56.975	83.156	62.478	584	0	7
S14_01_EnterHomePage	0.344	0.402	0.922	0.431	235	0	0
S14_02_Login	0.5	1.672	8.328	3.138	230	5	0
S14_03_AssignTeam	0.297	1.526	9.813	3.396	229	1	0
S14_04_LogOff	0.031	0.063	0.234	0.07	229	0	0
S14_05_LogBackIn	0.031	0.047	0.172	0.06	229	0	0
S14_06_MyQueue	1.391	3.502	21.516	6.822	229	0	0
S14_07_SubmissionSummary	0.516	0.773	5.063	0.975	229	0	0
S14_08_ACDBlank	0.219	0.601	14.359	0.652	229	0	0
S14_09_SaveACD	0.297	0.528	1.422	0.702	215	14	0
S14_10_AddEntry1	0.234	0.44	1.531	0.602	215	0	0
S14_11_AddEntry2	0.25	0.448	1.656	0.592	215	0	0
S14_12_ACDForm	0.234	0.542	2.109	0.733	215	0	0
S14_13_LogOut	0.031	0.074	1.109	0.12	215	0	0
S14_ACDOverall	20.563	25.095	55.859	30.537	215	20	0

HTTP Responses Summary

HTTP Responses	Total	Per second
HTTP_200	539,032	113.242
HTTP_302	640	0.134
HTTP_304	26,545	5.577
HTTP_500	14	0.003

